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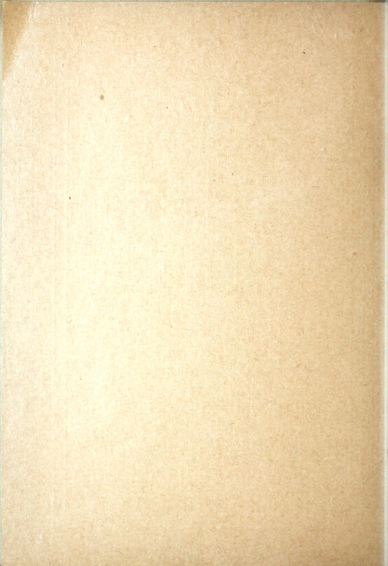
Floor Connections for Water Closets and Slop Sinks



A Paper presented by J. J. Cosgrove
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FLOOR CONNECTIONS
for
WATER CLOSETS AND SLOP SINKS
by
J. J. COSGROVE

MEMBER OF AMERICAN SOCIETY OF INSPECTORS
OF PLUMBING AND SANITARY ENGINEERS

In a paper read by Mr. J. S. Cassedy, Inspector of Plumbing, Winchester, Cambridge, Mass., at a recent meeting of the society, he said:

"It is curious to consider that most codes forbid the use of unions or slip joints on the sewer side of traps, and then allow the inconsistency of permitting a putty joint,—and in the final analysis that is what you get—under closets, especially in localities where a fixture test is not given. This brings us to the consideration of the question: 'Has the time arrived when we may insist that all water closets shall have their connection under seal?' I think so."

When Mr. Cassedy called the attention of the society to the use of putty, rubber and other objectionable materials for making joints between water

closets, or slop sink outlets and the drainage system, he pointed out the one weak surviving relic of the day, when, on account of the extent to which putty was used, the craft well deserved the name of "putty plumbers."

Most of the members here assembled can recall the time when joints in soil pipe which were more or less inaccessible for pouring and caulking, were made with putty. That, however, always was an illegitimate use of the material, never sanctioned by the better class of the trade, and thanks to suitable laws and efficient inspectors, the putty joint, in soil pipe is a thing of the past. But the prohibition of putty in soil pipe hubs did not legislate out of existence the putty joint, for there still remained three places in plumbing systems where the use of putty received official sanction and the stamp of approval. Those three places were: where common overflow wash basins were connected to waste pipes; at the collar of sinks; and at the floor connection of water closets and slop sinks. The first two, the connections to lavatories and sinks, were not objectionable from sanitary reasons, for the putty joints were on the fixture side of the traps and protected by the water seals. Nevertheless, improvements in lavatory connections were made and adopted by the trade immediately, the old putty joint at this point being prohibited; and the use of porcelain sinks and porcelain enameled sinks with improved waste connections has given the finishing stroke to the putty joints at the sink collars.

That the putty joint was on the fixture side of the trap was true, likewise, of early pan and other forms of closets which had traps under the floor, and

at that time the putty joint under closets was not objectionable from a sanitary point of view; but, improvements were made in the form and material of closets, and without attention being called to the matter or thought being given to the subject, the putty joint was shifted from the protected to the exposed side of the water seal. From a mere unsatisfactory and objectionable botch, from a workmanship standpoint, it became a sanitary nuisance which should never have been permitted. Custom alone, which had sanctioned the original protected putty joint, accepted this new one without noticing that conditions had been changed by moving the trap to above the floor, thereby bringing the putty joint on the sewer side of the seal.

Up to the present time there was some shadow of excuse for tolerating these unsanitary and unworkmanlike makeshifts, the putty and gasket joints, for no satisfactory closet connection had been put on the market and placed within the reach of all manufacturers. It is not sufficient that there be a suitable floor connection on the market if that connection is confined to one line of goods. To insist on its use under such conditions would create a monopoly, and that would be opposed to public policy.

As the matter now stands, however, there are several good, workmanlike, flexible, metal-to-metal connections, most of which can be had on any combination or make of closet. A few flanges are confined to the owner's own line of goods, but the rest are in competition with one another, and can be had by any responsible manufacturer of closets to use with his closets and slop sinks.

That being true, there is no longer any reason why the various health boards of the different cities should not prohibit putty and gasket joints, and insist that all water closets and slop sinks be fitted with flexible metal-to-metal floor flanges or waste connections. To do so it would hardly seem necessary to revise the several codes, for most of them now prohibit the use of putty and gasket joints in the drainage system.

Heretofore, owing to the lack of suitable floor flanges, the putty and gasket joints have been tolerated, but it would seem as though all that would now be necessary is a ruling from the various departments to the effect that after a certain period from that date, putty and gasket joints would not be allowed under closets or slop sinks.

So far, the objection to the use of putty joints is obvious, but the question might logically be raised "If gasket joints are found satisfactory for use in steam and water mains, why are they not equally satisfactory for soil-pipes?" The question is not so logical, however, as it might appear. Gaskets of whatever kind are perishable and while perhaps perfectly tight when new, they soon deteriorate in a drainage system and are destroyed.

Paper, paper-board, mineral fibre, or cloth and rubber, each or any makes a perfectly good gasket for use in steam or water unions, for the temperature of steam is such that no destroying bacteria can live within the pipes to break down the washers, and by keeping the gaskets always wet in a water pipe the water protects them from being destroyed, for just as

wooden piles which are kept under water will last indefinitely, so will gaskets in water last indefinitely; and just as wooden piles alternately wetted and dried or kept in a moist, warm atmosphere, such as will be found in the interior of a soil pipe, will sooner or later disintegrate, so will the gaskets inside a drainage system soon cease to perform their functions. Throw a piece of rubber packing, leather, or composition of any kind on the ground where it is moist and warm, and see how short a time it will last; or suspend a piece in a sewer or soil pipe, and see how soon it will be destroyed.

Paper and rags, which in a steam pipe or pure water pipe would last indefinitely, would be worthless inside of a few weeks if placed in a sewer or soil pipe. That statement is proved by some experiments conducted by the State Board of Health of Massachusetts, at Lawrence, to determine the length of time required to break down materials of that character. A considerable quantity of newspaper, cotton and woolen cloth, contained in a wire basket, was placed in a septic tank and allowed to remain there for two months and twenty-seven days, from October 4th to December 31st, 1900. When taken out, the cloth and papers were still intact, but so rotten that they fell to pieces when touched.

The rotting of fibre in that manner, when exposed to sewage, is what should be expected, for sewage contains within itself the means of its own destruction, and no more favorable place of incubation for the reducing bacteria could be found than in the chinks and crannies of soil pipe fittings, where the warm moist atmosphere is ideal for the purpose.

There is another reason why gaskets are permissible in steam and water piping, while objectionable in soil-pipe work. If there is a leak in a steam or water pipe, there is visible evidence of the leak in the steam or water escaping; and as either would be a source of expense as well as a nuisance, immediate steps would be taken to repair the leak. If a gasket under a water closet is not tight, on the other hand, there is no visible evidence of the insidious, enervating air escaping, and as no danger signals are displayed, nobody is aware of the danger, so repairs are not made. Gaskets might be perfectly tight when first put in, and may last a few years before rotting; but, in a system of house drainage, which is never tested after being passed by the plumbing department, every thing entering into the system should be made as near everlasting as possible, and this can be done only by requiring metal-to-metal closet floor connections.

In order that sufficient data will be available for any Department contemplating a revision of its code requiring flexible metal-to-metal closet and slop-sink connections, or any other action having the same end in view, I have gathered together in this paper, descriptions and illustrations of several closet connections now on the market. This number will no doubt be added to from time to time, as demand for a flexible metal-to-metal floor connection stimulates inventive imagination.

Screw Flange Connections

In Figure 1, is shown the Mott screw flange, which is an example of this type of connection. This flange provides an all metal-to-metal closet

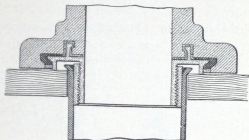


Fig. 1—Mott Screw Flange

floor connection, which is made up with a screw joint. The manner of connecting the metal to

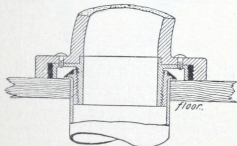


Fig. 2—Screw Connection made by Keystone Pottery, Trenton, N. J.

earthenware, and the way the closet is connected to the drainage system, are so clearly shown in the drawing that nothing more need be said about this

type of floor flange. It might be well to remark, however, that in addition to the Mott Flange, there is another similar screw connection, shown in Fig. 2, on the market, which is manufactured by the Keystone Pottery of Trenton, N. J.

Push-Nipple or Tapered-Joint Connections

There are two closet floor flanges, known respectively, as the Dozier Flange and the Foulois connection, each of which depends for its seal on a ground tapered surface similar to the push-nipple

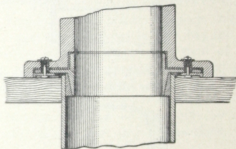


Fig. 3—Push-Nipple Joint

for a radiator. An illustration of the Foulois Flange which represents this type of connection is shown in Fig. 3. The tapered ground-surface method of forming a joint is too well known to the trade to require further mention. Everybody is familiar with the push-nipple joint.

Union Coupling Connections

In the Maddock closet floor flange, Fig. 4, we have the union principle applied to the closet flange.

This is a threaded connection, the parts of which are drawn together the same as is a union joint, by means of a threaded ring connected to the lower members of the coupling.

Ball-Joint Adjustable Closet Flange

In the Standard Sanitary Mfg. Co.'s floor connection, Fig. 5, we have a floor flange built on the well-known ball-and-socket principle, which permits

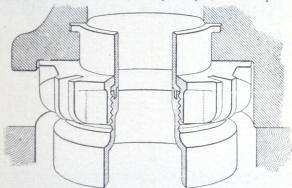
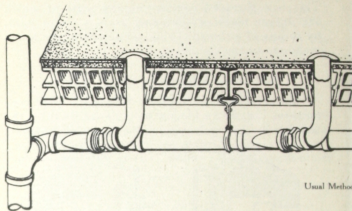


Fig. 4—Bamford Flange made by Maddock, Trenton, N. J.

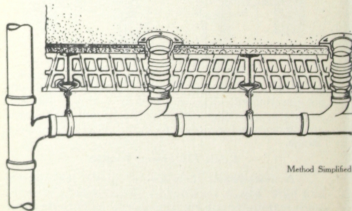
of adjustment should the parts be out of alignment or a settlement of the floor occur. This connection is further provided with a vertically adjustable seat to compensate for variations in the closet base or floor flange.

Leak Detecting Flange

A new idea is incorporated in the leak-detecting joint, Fig. 6, invented by Mr. Edward C. Stover and manufactured by the Trenton Potteries Co.



Usual Method



Method Simplified

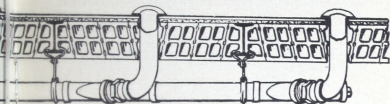


Fig. 8
Roughing-in for Closets

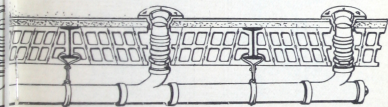


Fig. 9
Using Flexible Connections

In this flange, if the ground joint *a* should leak, owing to the construction of the connection water

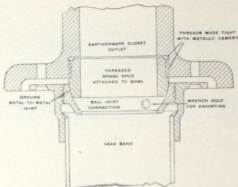
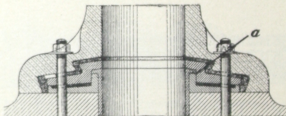


Fig. 5—Ball-Joint Adjustable Closet Flange

would pour out around the closet base giving notice of defective contact.



* Fig. 6—"Leak Proof" Flange of the Trenton Potteries Company
Invented by Edward C. Stover

The objection has been raised in the past to the screw thread connections, push nipple connec-

* This flange was inadvertently overlooked when the paper was originally prepared, but is now included to make the record complete.—J. J. C.

tions, and coupling connections, that they are perfectly rigid, lack flexibility, and in case of a shrinkage of floors, or a settlement of the floors or stacks, would not give or adjust themselves to the new condition of affairs.

Such criticisms have been well founded, heretofore, and if there were no means of overcoming these objections the floor flanges would be found wanting.

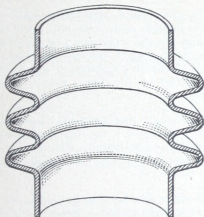


Fig. 7—Flexible Connection

Fortunately, however, when a closet floor flange of any type is used in connection with the flexible connection shown in Fig. 7, it possesses every quality of adjustability and flexibility that could be desired.

In the case of the push nipple connections, which have no means for vertically adjusting the parts, the folds of the flexible connection will widen out under the pull of the closet bolts, thus bringing the tapered

parts to a good metal-to-metal bearing. Further, when used with any kind of flange whatsoever, in case of a shrinkage or settlement of the floor, instead of holding the closet rigidly in place, with a crevice between the closet base and the floor, the folds of the connection will be pressed together by the weight of the fixture when in use, and the closet base will be pushed firmly down on the floor, without damage to the fixture, or straining of any of the parts.

On the other hand, should the stacks settle, the folds of the flexible connection will open out, thereby compensating for the settlement; or, should the stacks or branches be forced to one side, the convolutions or the folds of the flexible connection will expand on one side and contract on the other, without straining any of the parts.

It will be seen, therefore, that using this flexible connection with any of the types of metal-to-metal floor connections illustrated, will provide a flexible, adjustable metal-to-metal coupling that leaves nothing to be desired.

This flexible member can be had made of lead in the form of straight pieces or bends, or it may be had in soft copper, either straight or bent, with threaded ends for use in wrought pipe drainage systems. The flexible bends can be purchased of any jobber of plumbing supplies and incorporated in the installation by the plumber as the work progresses.

It might not be out of place here to call attention to the improved method of connecting metal to earthenware shown in the Standard ball-joint closet floor flange.

This connection consists simply of a threaded outlet passage in the earthenware of the closet which is made perfectly and permanently tight by screwing into it a threaded nipple. This form of connection can be used with any type of floor flange made, and in connection with any manufacturer's line of goods, by securing permission from the Standard Sanitary Mfg. Co., a fact worth knowing, as architects might often object to a connection, for no other reason than the manner in which it is secured to the earthenware bowl.

A feature of the closet floor flange business which is worth calling to your attention, is the generosity of manufacturers in permitting their floor flanges to be used by other manufacturers in connection with their line of goods.

Generally, the practice has obtained among manufacturers, when they have a good patent, to confine the article to their own combinations. In the case of closet floor connections, however, as before mentioned, with the exception of a few manufacturers, all the other owners of patents are licensing competing firms to use their flanges.

As was pointed out by Mr. Cassedy a year ago, it seems like a travesty on plumbing practice to require an expensive system of back venting; insist on the use of extra heavy or extra strong soil pipe; specify full weight, and heavy gauges of brass, and lead, as the minimum that will be permitted; maintain a department of inspectors at great cost to see that the laws are complied with, then permit a putty joint to be used at a point where, on account of its size and the jars the fixture receives, it negatives the good result expected of plumbing laws and

plumbing inspection. The joints might be tight when first put in and the putty is in a plastic condition, but as soon as the oil dries out and the closet receives a jar, the seal is broken at that point.

While on this subject it might be of interest to those who have never been called upon to smoke-test old installations, to cite the opinion of Mr. A. A. DuMond, an authority on smoke testing, who has devoted several years to this branch of plumbing. According to this authority "Not over 15 per cent. of old plumbing installations, taking them as they run, those which were installed before with those which were completed since the adoption of plumbing laws, are in perfectly good condition. In the 85 per cent. of defective cases, 30 per cent. will be found to require slight repairs; 35 per cent. will require extensive repairs, and about 20 per cent. will be found so defective as to render the buildings unfit for habitation. Where tile pipes have been used for the house drain, without exception they will be found to leak at most of their joints; *and of the 85 per cent. of buildings in which defects are found, fully 90 per cent. of them will be found defective between water closets and slop sinks, and the soil pipe where the putty joints have been used.*

In view of the facts set forth, it would seem that the time has arrived when it is necessary for those interested in plumbing practice, to take a firm stand for the adoption of flexible metal-to-metal waste connections for all water closets and slop sinks. Of course, such a stand will meet with a certain amount of opposition, for we all dislike to be legislated into doing things, even for our own good. Had anyone

suggested the compulsory use of basin couplings instead of the old putty joint, opposition would have risen on all sides, to cry him down, even though the opposition knew the couplings bettered the system and were wanted by architects, plumbers, inspectors and the public at large. No opposition having been encountered, the couplings were adopted, and although the cost is greater than the cost of the putty joint, more lavatories are now made and sold than ever before; and this is due solely to the improved materials and connections, which, making them more sanitary, has opened a way for them into sleeping rooms. The architect who would specify, or the plumber who would recommend an old putty-joint connection wash basin, would soon lose his trade; and what is true of the putty joint lavatory will soon be true of the putty joint closet and slop sink.

In the meanwhile, until the merits of a metal-to-metal connection become better known, objection might be raised in some quarters on account of the increased cost. In matters affecting the public health, though, do the authorities ever hesitate on account of the cost? I believe not.

At an outlay of millions and millions of dollars the larger cities construct water works, filtration plants, sewer systems and sewage purification works, to try to conserve the public health. Supplementary to these efforts the Health Boards insist on traps and back vents instead of straight open pipes; fresh air inlets where running traps are used; certain standards of weights and quality for the materials used, and careful inspection, even though the approved system costs the householder more than an unsanitary one.

Why, then, should the matter of a few extra dollars in the cost of the plumbing for a building cause a halt, when those few dollars strengthen the one acknowledged weak point in the entire system from house top to sewer outlet? So far as the home owner is concerned, he would gladly pay the difference even though there were no laws to coerce him; and in the case of investment buildings like hotels, offices, and business places, there should be no hesitancy in taking the stand on account of any extra cost.

But, as a matter of fact, there will be no extra cost. If there is any difference in cost, it will doubtless be lessened by using flexible metal-to-metal connections. I am not speaking now of the saving effected annually in repairs due to breakage from settlements, but the actual saving in the cost of installation.

In large buildings, many stories in height, provision must be made to prevent the shrinkage of floors, or settlement of floors or stacks, from pulling apart the branches or breaking the fixtures.

When a battery of closets are connected up together, a common practice is to take off the closet branch from the stack, as shown in Fig. 8, at right angle to the line of closets, then turn with an elbow and use bends to connect the Y fittings to the closet floor flanges. This is done so there will be a certain amount of "give" should a settlement occur.

But it will be observed, the materials and construction of the fittings are such that whatever "give" there is will be due to a giving, twisting or distortion of the parts, which are crushed together, pulled apart, or started in the threads as the case may be, so that when the settlement has subsided and the pipes have

become adjusted in their new position, there is no knowing whether or not they are tight.

When flexible, metal-to-metal connections are used, on the other hand, as may be seen by comparing Fig. 9 with Fig. 8, sufficient materials and labor are saved to pay for the flanges, while at the same time, the system is simplified, and possesses a flexibility which permits of any reasonable settlement, shrinkage or sway without straining, crushing or otherwise affecting the piping or fixtures.

In so far then, the flexible connection not only betters the system and simplifies it, but it does so at no greater expense, if indeed it does not effect a saving.

In considering the question of cost, the mistake must not be made of charging the extra expense, if any, to the closet fixtures.

If one were to add the cost of a metal-to-metal connection to a cheap fixture, costing the plumber say fifteen dollars, the cost of the connection would look out of proportion; whereas if added to the cost of plumbing installations, averaging between \$150 and \$2,000, the cost becomes too insignificant for a sensible and reasonable person to object to.

That useless, offensive and objectionable appendage, the fresh air inlet, has been retained in practice in many localities, in spite of the cost, which is several times that of the floor flanges for an ordinary residence. Why could not the systems be bettered in every way and the cost to the household reduced by dispensing with or abolishing the fresh air inlets and requiring flexible metal-to-metal closet and slop-sink

connections? A ruling to that effect certainly could find no opponents, for by the one act the plumbing system is both bettered and cheapened.

There is one point I cannot close this paper without touching upon and that is the laxity of some plumbing codes with regard to slop sinks.

As little protection as the old closet flange with putty joint affords, it is better than the putty joint without the flange; yet very few codes require slop sinks to be connected up as are water closets.

This does not seem right, and if a concerted action is taken towards doing away with the putty and gasket joints in closets, it would seem inconsistent to still permit their use in connection with slop sinks. When the putty and gasket joints are driven from plumbing practice, let it be finally, and completely, without exception.

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